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EXAMINER	
WILSON, MICHAEL H	

ART UNIT	PAPER NUMBER
1786	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/580,836	LENNARTZ ET AL.	
	Examiner	Art Unit	
	MICHAEL WILSON	1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3 and 5-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-12 and 14-19* is/are rejected.

7)☒ Claim(s) *13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application.
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action is in response to Applicant's amendment filed 15 February 2010, which cancels claims 2 and 4, amends claims 1 and 3, and adds new claims 16-19.

Claims 1, 3, and 5-19 are pending.

2. Applicants overcame the rejection of claims 1, 2, 4-6, 8, and 13 under 35 U.S.C. 102(b) as being anticipated by Song et al. (Synthesis and luminescent study of diphosphine-Pt-diacetylide complexes for OLED.) by amending the claims in the reply filed 15 February 2010.

3. Applicants overcame the rejection of claims 1, 7, and 9-12 under 35 U.S.C. 103(a) as being unpatentable over Rubner et al. (US 6,548,836 B1) in view of Song et al. (Synthesis and luminescent study of diphosphine-Pt-diacetylide complexes for OLED.) by amending the claims in the reply filed 15 February 2010..

Specification

4. The disclosure is objected to because of the following informalities:

Page 17 of the specification ([0077] in the PGPub) defines binap as 1,1'-binaphthyl however the commonly accepted definition of binap is 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl. Defining binap as only 1,1'-binaphthyl is

believed to be a typographical error because the commonly accepted binap is shown in structure (Ib) on page 9 of the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 19, the claim is indefinite because the complex recited by the claim is not within the scope of instant formula (I). A 1,1'-binaphthyl does not posses a nitrogen or phosphorous that can bind with the platinum(II) center. The examiner believe Applicants intend 1,1'-binaphthyl to be 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl which is commonly referred to as binap and shown in structure (Ib) in page 9 of the specification. However binap is also outside the scope of the present claims. Instant formula (I) requires X to be either a 1,2-phenylene or a 2,2'-biphenylene. Binap possess a binaphthylene not a biphenylene.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1, 3, 5-12, 14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rubner et al. (US 6,548,836 B1) in view of Kuimova et al. (A fast time-resolved infrared spectroscopic investigation into the nature of the lowest excited state and excimer formation in Pt^{II} diamine cyanides.) and Song et al. (Synthesis and luminescent study of diphosphine-Pt-diacetylide complexes for OLED.).

Regarding claims 1, 3, 5-12, and 14, Rubner et al. disclose a solid state light-emitting device (OLED) comprising a light-emitting layer between two electrodes (column 3, lines 43-46). The reference discloses the light-emitting layer comprises a metal complex (column 3, line 66 to column 4, line 4, and lines 27-35). The reference also discloses that the metal complex may be a platinum complex and have polypyridine ligands such as phenanthroline (column 8 lines 33-42). The light-emitting layer may consist of metal complex (column 6, lines 5-22) or contain additives (column 5 lines 49-63). The disclosed device can be part of a display device such as a flat-panel display, computer screen or other item that requires illumination (column 1, lines 11-14).

However, the reference does not explicitly disclose a complex of instant formulae (II) as the light-emitting complex.

Kuimova et al. teach light-emitting a complex similar to instant formula (II) (abstract). The reference teaches the complex relate to instant formula (II) wherein o is 0, m and n are 1 (unsubstituted phenyl), and R7 and R8 are CN (page 2857, second column). The complex is taught to be emissive in the solid state (page 2858, first column).

Song et al. teach luminescent platinum(II) complexes (abstract). The reference teaches that using a strong-field ligand as the ancillary ligand (R7 and R8) of a platinum(II) complex deactivates non-radiative ligand-field transition (Song page 192, second paragraph of results and discussion) and specifically teaches acetylide ligands as suitable. Cyano and acetylide are both known to be strong-field ligands, therefore one of ordinary skill in the art would reasonably expect cyano and acetylide to be equivalent and interchangeable, both resulting in similar complexes suitable for the same purpose. It would have been obvious to one of ordinary skill in the art to substitute cyano with acetylide and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally it would be obvious to try and replace the cyano ligands in the platinum complex of Kuimova et al. with the acetylide ligands of Song et al. given that Song et al. teach strong-field ligands deactivate non-radiative

ligand-field transitions in platinum(II) diimine complexes (Song page 192, second paragraph of results and discussion) and demonstrates luminescent platinum(II) complexes with acetylide ligands. One of ordinary skill in the art would readily expect the resulting compounds to have similar properties and be suitable for the same purpose because Kuimova et al. demonstrates diphenylphenantholine to be a suitable diimine ligand for a luminescent platinum(II) complex and Song et al. demonstrate acetylide to be a suitable ancillary ligand for luminescent diamine platinum(II) complexes.

It would be obvious to one of ordinary skill in the art at the time of the invention to use the platinum(II) complex of modified Kuimova et al. in the device of Rubner et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Kuimova et al. teach the complex is luminescent in the solid state and Rubner et al. disclose platinum(II) diimine complexes are both suitable (bipyridine and phenanthroline are both diimine ligands). Further it is well known in the art that photoluminescent complexes will also emit light when an appropriate electrical current is passed through them, $Ru(bpy)_3^{+2}$ used by Rubner et al. (column 6, line 2) is a well known photoluminescent complex , which would also give one of ordinary skill in the art a reasonable expectation of success. One of ordinary skill would be motivated to try and use the complexes of Kuimova et al. in the device of Rubner et al. by a desire to utilize the light-emitted from the complexes of Kuimova et al.

Regarding claims 16 and 17, modified Rubner et al. disclose all the claim limitations as set forth above. While claims 16 and 17 further limit instant formula (I) the

claims do not require a complex of instant formula (I), therefore the claims are meet as described above.

10. Claims 1, 3, 5-12, 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rubner et al. (US 6,548,836 B1) in view of McGarrah et al. (Dyads for photoinduced charge separation based on platinum diamine bis(acetylide) chromophores: synthesis, luminescence and transient absorption studies.), Song et al. (Synthesis and luminescent study of diphosphine-Pt-diacetylide complexes for OLED.) and Miskowski et al. (Electronic spectra and photophysics of platinum(II) complexes with α–diimine ligands. Mixed complexes with halide ligands.).

Regarding claims 1, 3, 5-12, 15, and 18, Rubner et al. disclose a solid state light-emitting device (OLED) comprising a light-emitting layer between two electrodes (column 3, lines 43-46). The reference discloses the light-emitting layer comprises a metal complex (column 3, line 66 to column 4, line 4, and lines 27-35). The reference also discloses that the metal complex may be a platinum complex and have polypyridine ligands such as phenanthroline (column 8 lines 33-42). The light-emitting layer may consist of metal complex (column 6, lines 5-22) or contain additives (column 5 lines 49-63). The disclosed device can be part of a display device such as a flat-panel display, computer screen or other item that requires illumination (column 1, lines 11-14). However, the reference does not explicitly disclose a complex of instant formulae (III) as the light-emitting complex.

McGarrah et al. teach a light-emitting complex similar to instant formulae (III) (abstract and compound 1, 1-PTZ, and 1-TPZ page 4359). The reference teaches the complex related to instant formula (**III**) wherein p, and q are 1 (t-butyl) and R12 and R13 are acetylide. The complexes are taught to be light-emitting (table 2, page 4361).

Song et al. and Miskowski et al. both teach luminescent platinum(II) complexes (abstract of each). The reference teach that using a strong-field ligand as the ancillary ligand (R12 and R13) of a platinum(**II**) complex deactivates non-radiative ligand-field transition (Song page 192, second paragraph of results and discussion; Miskowski page 2523, second paragraph). Cyano and acetylide are both known to be strong-field ligands, therefore one of ordinary skill in the art would reasonably expect cyano and acetylide to be equivalent and interchangeable, both resulting in similar complexes suitable for the same purpose. It would have been obvious to one of ordinary skill in the art to substitute acetylide with cyano, which is demonstrated by Miskowski et al. to give luminescent complexes in similar platinum(**II**) diimine complexes (page 2522, first column, third full paragraph), and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the platinum(II) complexes of McGarrah et al. in the device of Rubner et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given

that McGarrah et al. teach the complexes are luminescent in the solid state and Rubner et al. disclose platinum(II) diimine complexes are both suitable (bipyridine and phenanthroline are both diimine ligands). Further it is well known in the art that photoluminescent complexes will also emit light when an appropriate electrical current is passed through them, $Ru(bpy)_3^{+2}$ used by Rubner et al. (column 6, line 2) is a well known photoluminescent complex , which would also give one of ordinary skill in the art a reasonable expectation of success. One of ordinary skill would be motivated to try and use the complexes of McGarrah et al. in the device of Rubner et al. by a desire to utilize the light-emitted from the complexes of McGarrah et al.

Regarding claims 16 and 17, modified Rubner et al. disclose all the claim limitations as set forth above. While claims 16 and 17 further limit instant formula (I) the claims do not require a complex of instant formula (I), therefore the claims are meet as described above.

Allowable Subject Matter

11. Claims 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 19 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach or suggest light-emitting devices with platinum(II) complexes with diphosphine ligands as defined in the present claims. Song et al. (Synthesis and luminescent study of diphosphine-Pt-diacetylide complexes for OLED.) teach diphosphine platinum(II) complexes, however these complexes are not within the scope of the present claims nor do they make the presently claimed complexes obvious to one of ordinary skill in the art.

Response to Arguments

14. Applicant's arguments filed 15 February 2010 have been fully considered but they are not persuasive.

Applicants argue that solely because two ligands may be strong-field ligands does not mean the ligands or complexes derived from the ligands will exhibit the same properties. For example, CO is known to be a strong-field ligand. However, it is readily recognized by those of ordinary skill in the art that complexes of a metal with carbon monoxide are substantially different both physically and chemically in comparison to complexes of a metal with a cyano ligand. Applicants thus submit that the Office's assertion that cyano and acetylide are "equivalent and interchangeable" solely on the basis that they are both strong-field ligands is unsupportable as a matter of fact. However the examiners position that a cyano ligand would be obvious is not solely based upon the general recognition that cyano is a strong field ligand but is based on both the teaching of Song et al. (Synthesis and luminescent study of diphosphine-Pt-

diacetylide complexes for OLED.) that strong field ligands deactivate non-radiative ligand field transitions in platinum(II) complexes and that Miskowski et al. (Electronic spectra and photophysics of platinum(II) complexes with α–diimine ligands. Mixed complexes with halide ligands.) teaches platinum(II) diimine complexes, specifically bipyridines, to be luminescent complexes with similar properties. Both of these teaching together would lead one of ordinary skill in the art to expect acetylide and cyano to be equivalent and interchangeable resulting in similar complexes with similar (but not identical) properties. Also Che et al. (Solid-state emission of dicyanoplatinum(II) and -palladium(II) complexes of substituted 2,2'-bipyridines and 1,10-phenanthroline and x-ray crystal structures of isomorphous M(bpy)(CN)2 (bpy= 2,2'-bipyridine; M = Pt, Pd).) show that the effect of cyano as an ancillary ligand is generic to platinum(II) diimines. The reference teaches three platinum(II) cyano complexes with different diimine ligands. Changing the diimine ligand (bipyridine to dimethylbipyridine to phenantholine) alters the exact emission wavelength but each complex posses similar properties (i.e. all are strongly luminescent).This further supports the position that one of ordinary skill in the art would reasonably expect a cyano derivative of McGarrah et al.'s complexes to posses similar properties and be suitable for the same purpose.

Applicants also argue that Miskowski et al. fails to disclose a platinum(II) complex corresponding to the cyano-substituted material of formula (III) of amended Claim 1. However Miskowski et al. is not relied upon to teach the diimine ligand of instant formula (III) but to teach cyano as an ancillary ligand. McGarrah et al. (Dyads for photoinduced charge separation based on platinum diamine bis(acetylide) chromophores: synthesis,

luminescence and transient absorption studies.) is relied upon to teach a bis(t-butyl)bipyridineplatinum(II) complex. Both McGarrah et al. and Miskowski et al. together with Song et al. are relied upon to teach the complex of instant formula (III).

Applicants also argue that the rejection of the claims amounts to little more than hindsight reasoning. The Office, Applicants asserts, searched the art to find different components and ligands of the platinum complexes recited in the present claims and used such disclosure as a basis for asserting that the particular complexes recited in the claimed would be obvious and argue that the trouble with the Office's reasoning is that it makes any and all known or unknown platinum complexes obvious.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case McGarrah et al. is relied upon to teach a bis(t-butyl)bipyridineplatinum(II) complex while Miskowski et al. with Song et al. are relied upon to render the cyano derivative of McGarrah et al.'s complex obvious to one of ordinary skill in the art. The references in combination teach that bis(t-butyl)bipyridineplatinum(II) complexes are luminescent, strong field ligands such as acetylide deactivate non-radiative ligand field transitions, and cyano, another strong

field ligand, also results in luminescent complexes. Therefore it would be obvious to one of ordinary skill in the art to try and substitute an acetylide with cyano and reasonably expect a similar complex with similar properties (i.e. exchanging "equivalents"). Thus the present rejection is not based upon hindsight reasoning but on the teachings of the prior art. The examiner is also not arguing that all platinum complexes would be obvious but that platinum(II) diimine complexes with cyano or acetylide ancillary ligands would be obvious.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1786

MHW